FADCA BEACON

The FLORIDA AMATEUR DIGITAL COMMUNICATIONS ASSOCIATION Newsletter
Vol. 1, No. 6 Brandon, Fl July 1984

FADCA Nets
3958 Khz. Sundays at 8 AM by K4NTA in Stuart, Fl
147.165 Mhz. Sundays at 7 PM by KF4EF in Tampa Area, Fl
147.285 Mhz. Sundays at 9 PM by K4AHO in Orlando, Fl
145.010 Mhz. Statewide Packet Radio Frequency

REFLECTIONS ON THE PERSIAN GULF

GWYN REEDY, W1BEL
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It is good to be home! Travel is interesting, but living out of a suitcase gets monotonous. During the three month assignment I spent about 30 days on board ship, 30 days in Saudi Arabia, and the remainder making short trips to Bahrain, Kenya, and the British Indian Ocean Trust (Diego Garcia). The time aboard ship was very interesting and afforded the most time to work on ham projects. I was able to build a KAYPRO-like portable computer using one of the surplus XEROX 820 single board computers. Perhaps a construction article will be forthcoming about that.

Saudi Arabia is very interesting because of the combination of modern physical facilities and a midieval culture. Ham radio is practiced there (HZ and 7Z prefixes) but only by subjects of the Kingdom. There is one exception, the Dhahran Airport Amateur Radio Club (HZ1AB). The station was established nearly 30 years ago and continues in active operation by US civilian and military amateurs. The club very graciously allowed me to use their facilities during my stay and I enjoyed filling several pages in the log book, including a contact with K4NTA. Being on the other end of a DX contact was fun, but I think I'll stick to digital DXing for now. The station has RTTY and OSCAR 10 facilities as well as several HF rigs. They are contemplating a moonbounce operation, too, so don't be surprised if they show up on packet one of these days.

The common factor in the mid-east that made an impression on me was the repressive attitude about communication. Each time through the many Customs inspections was a hassle because electronic equipment is carefully scrutinized and its purpose questioned. Entertainment electronics are readily accepted, but videotapes are confiscated (Saudi Arabia). The established amateurs in the countries know how to work the system to get their gear imported, but in general radios are considered subversive.

Packet radio is a communication revolution for the amateur community and its value really hit me during this trip. When the packet networks now being planned are in operation, the exchange of technical and operational information among amateurs will be so vastly improved that it will generate a whole new wave of enthusiasm, experimentation, and development. Its a great hobby and a great country in which to practice it.

TWO METER PACKET METEOR SCATTER

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The Perseids is one of the best of the numerous meteor showers which occur throughout the year. Although this shower usually peaks around August 11th or 12th, many contacts are made via the ionized trails of these meteors a number of days before and after the peak. At 2 Meters, the duration of meteor bursts can run from milliseconds to a few minutes. Most of the early VHF meteor scatter (M/S) work on VHF was done on 144 MHz using CW as the mode of communications at speeds of 15 to 35 WPM. As single sideband equipment became available on 2 Meters, many contacts were made via M/S using that mode. Voice speeds range from 250 to 350 WPM. A greater signal to noise ratio is needed for SSB, probably between 4 and 6 dB more.

Two Meter SSB M/S contacts have been made by many stations 1000 miles apart running no more than 100 watts to a 10 dB gain Yagi antenna. Since the transmission data rate of SSB is approximately 10 to 15 times faster than CW, a complete two way SSB contact can be made on meteor burnout which lasts from 10 to 15 seconds. Since most M/S calling sequences used by 2 Meter stations are 15 seconds long, it is possible to get a fifteen second long meteor burst and still not make a contact. The problem is to catch the meteor at the right time.

Now along comes Packet Radio with its 1200 baud transmissions. At 8 bits per character (letter), data is being sent at a rate of approximately 150 characters (30 words) per second. That's about 1800 words per minute or about 6 times the rate of fast human speech. In packet radio the actual data rate is a little lower because of the extra flag, address, control and frame checking bits needed to make the packet transmissions possible. At the 1200 baud rate, the overhead amounts to about 130 to 150 milliseconds per packet, for an effective data transmission rate of over 120 characters per second or about 25 words per second. That's still really moving compared to CW or the human voice. Almost all of the voice 2 Meter M/S work in the past has been done on single sideband. Since stations can't hear each other until a burst is heard and since that burst will probably be very short, tuning in a SSB station to within 100 Hz is not very easy to do. With packet radio, the tones going into its modem have to be within about 100 Hz of the required frequency. Once the frequencies have been properly set at both ends of the path there is another problem to be faced and that is one of Doppler shift which occurs on many meteor bursts. By using audio frequency shift keying (AFSK) of an FM transmitter the problem of the Doppler shift is reduced. However the price to be paid by using FM AFSK instead of SSB is that a much greater signal strength is needed at the receiver to produce the desired reliability. Nominally 17 to 23 dB of quieting is needed by most of the available packet radio modems to get good copy.

Although the 6 Meter band would produce longer bursts and less doppler shift than 2 Meters, most packet radio experimentation on VHF is being done on the 145 MHz band. There are also many more FM transceivers on 2 than on 6 Meters so that is why I am proposing that tests be run during the 1984 Perseids meteor shower to prove (or disprove) that FM can be used as a mode for M/S packet radio communications over a path of 900 to 1200 miles on the amateur 2 Meter band.

I am proposing that packet radio stations on the East coast of the U.S. attempt to communicate with similarly equipped stations in the mid western U.S. by using the following standards:

1) Frequency.....145.050 MHz
2) Effective radiated power.....1000 Watts erp (minimum)
3) Transmission sequencing.....Random (TAPR beacon mode)
4) Transmission mode.....FM AFSK

Set MTO or MFROM to ALL (This will allow you to see all packet radio activity on the channel).

If you plan to participate in the transmit phase of the 2 Meter packet radio meteor shower test additional setup recommendations are:

Set BTEXT to a brief message with at least your grid locator. See article in Jan 1983 QST page 50 for how to determine your grid locator.

Set UNPROTO to your state abbreviation so even if you go to the CONV mode and only a carriage return is typed, the result will be seen as your callsign plus state. Other TAPR boards would see transmissions of a carriage return sent by this station as K1HTV>MD, because I would have set the TO address field with the UNPROTO command to the abbreviation of my location which is MD.

Set BEACON to BEACON EVERY 1. Set XMITOK to ON (If a TAPR board is set up in this manner, the beacon text will be sent once every 10 seconds.)

If beacon messages are being copied successfully via meteor ionization and one wishes to try to make a connect with the station heard it is further suggested that the TAPR board FRACK command be set to 1 (1 second). Next, set the RETRY command to 0 (infinite retry) which means that the board will keep trying to connect every FRAC time to the station whose call is in the CONNECT command. It is recommended that if a CONNECT is not made within 10 to 15 minutes, that the stations either revert to the BEACON mode or move off the 145.050 MHz calling frequency.

Stations wishing to run meteor scatter schedules with other 2 Meter packet radio stations are asked to QSY to another frequency away from the proposed M/S packet calling frequency of 145.050 MHz.

If participating stations have the capability of capturing data on disk from their packet boards it is suggested that they do so at all times while listening on 145.050 MHz especially during the hours when no one is in the shack.

For those not familiar with the Perseids meteor shower, it will peak this year on August 11th. It will generally produce meteors at least 4 days before and after the peak day. During the peak of the shower as many as 60 meteors per hour are not uncommon. Just how many will be sufficiently large enough to produce the ionized patch needed to propagate a readable signal at the 1000 mile plus range for this M/S packet radio test is unknown.

If you have any comments on the above draft please mail them to me at the above address or phone me at any time between 5 PM and 10 PM at my home.

Note: The Central Iowa Technical Society is promoting 6 Meter FM tests on 50.505 MHz as well as the 2 Meter tests described above. FADCA members are invited to participate

GATORLINK II

Tom Kneisel, K4GFG
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GATORLINK II is the name that has been chosen for the 1260 Mhz transceiver that is being designed for the high speed network "GATORNET". GATORNET proposes to link together our local digipeaters on 220 and 1260 Mhz so that the 2 meter input frequencies will be free of internet (inter-city) traffic. Once linked together on UHF, the digipeaters may then each move to a different 2 meter input frequency. Once implemented, these changes will significantly improve SOUTHNET performance allowing reliable connections and speedy packeting to stations at great distances.

Proposed specifications for the GATORLINK II transceiver were discussed at a meeting of the FADCA linking committees held on July 7 in West Palm Beach. Some of the specifications are shown below:

FREQUENCY RANGE	1258-1291 Mhz
OPERATION	Full Duplex
T/R SPACING	+/- 30 Mhz nominal
CHANNEL SPACING	200 Khz
DATA RATE	75 K Baud max.
TX RF POWER OUTPUT	10 Watts
MODULATION	F1
TX DEVIATION	30 Khz max.
RX SENSITIVITY	-107 dBM for 10^{-4} BER
RX IF BANDWIDTH	100 Khz
IF FREQUENCIES	30 Mhz, 4.5 Mhz

The transceiver is actually composed of

separate transmitter and receivers, with a programmable frequency synthesizer for local oscillators. Second and third receivers may be added to GATORNET sites that need full duplex communications with more than one other GATORNET site. A moderately high gain collinear antenna is being designed for use with the GATORLINK II transceivers. Operation will primarily be over microwave line-of-sight type paths up to about 40 miles in length. Longer paths might be possible with the addition of larger antennas and higher power.

The RF design committee currently has 5 members: KE4PT, WB4KGY, K9BCT, KI4T, and myself. I'm still looking for another designer interested in receiver or synthesizer work. Assuming I can bring some more help on board, two prototype transceivers could be ready for testing early in 1985. It is a challenging project we have undertaken to design these GATORLINK II transceivers. Once the design is proven here in Florida, it could be used by packet radio groups all across the continent, helping to make widespread internet linking a reality. Watch for more progress reports in the BEACON.

BYTES FROM THE WRITE ONLY MEMORY

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From Gwyn, W1BEL we hear that a group of Tampa Bay area FADCA members met for breakfast on July 14th to discuss erection of a dedicated digipeater to serve the area. The meeting was called by KF4EF (Pat) and attended by KF4LG (Bill), KK4S (Ray), W4APV (Jim), K4RHD (Bill), KA4IQZ (Wayne), and W1BEL (Gwyn). Donations of money, equipment, and services were arranged that will allow erection of a digipeater on 145.01 that is expected to serve Pinellas and Hillsborough counties and adjacent areas. Support was also pledged for establishing a permanent digipeater at the Lake Wales site so successfully operated on a trial basis by KE4PM and N4APC earlier this year. Check into the Sunday evening FADCA net on the Brandon repeater for further information.

The Jacksonville Hamfest is August 3rd and 4th at the Jacksonville Civic Auditorium. FADCA will have a booth and a two hour sopt on the program. Lyle Johnson from Tucson Amateur Packet Radio will be our guest and speaker on the program. Lyle is bringing along some TNC kits that will be sold to anyone who just can't wait. Hope to see you all at Jacksonville.

I heard from Bill, WD4JKM that there will be a packet to RTTY gateway in Hollywood. Ed Webb, W4FQM, who operates the fine baudot RTTY repeater on 146.70 -600, I understand will hae the gateway up and running be Sept. 1st. Bill tells me that the packet side of it will be on 145.010.

On the digipeater scene; WD4JKM tells me that W4NVU, the Dade Radio Club's digipeater in Miami is presently operating at the Dade County E.O.C. but work is underway to find a nice high downtown building in Miami for it's permanent home. Jack, KF4WM in Orlando tells us that the Orlando FADCA group is working on a 300' tower site there. They have almost everything they need to do it, but may need to use a professional tower man to hand the feedline and antenna, a requirement of the tower owner. George WB4QJP in Okeechobee will be putting up a digipeater on his 400' tower soon. If everything goes will, this one should be on the air some time in late August. I understand that the Jacksonville group has a digipeater operational now on 147.075. It will end up on 145.010. Other digipeaters now in operation are WA4ARE-1 in West Palm Beach and K4NTA-1 in Stuart.

We now have three Bulletin Boards in operation in Florida. Miami is NK4K, West Palm Beach is WD4LHF and Stuart is K4NTA. All now have automatic logon by just connecting with the BBS station. All have up/down load sections for exchanging programs and files and message sections. Some time down the road, I hope to see these BBS's talking to each other automaticly in the wee hours of the night and relaying messages back and forth.

Is anyone out there on HF packet yet? I know that there is activity on the 10 Mhz. band up north. I am sure that they can be worked from here. How about someone setting up a gateway from two meters to thirty

meters? For that mattter, I know that many operate both packet and AMTOR. Anyone wnat to work on a gateway from packet to AMOTOR?

We all are sorry to Bernie, N4FOC leave the area. He got a nice promotion and is now in the Chicago area. Florida's loss is Chicago's gain. Bernie is a fine gentleman and will be missed. Good luck Bernie

THE HOMEBREWED FRAME

by Howard Goldstein N2WX
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The Residue Latch
(rumination and rumor register)

THINGS TO DO. Did I hear someone say that their isn't anything to do during the summer unless: A) it involves a comfortable berth, or B) a biting cold beverage?

- FILE TRANSFER PROTOCOL
  - SPLIT SCREEN TERMINAL PROGRAMS
  - TEXT COMPRESSION ALGORITHM

Do we need to arrive at some standard for interchanging ASCII files? This probably is necessary if there is going to be automated transfers of files between the Bulletin Board Systems on the network. Tom Kneisel, K4GFG, points out the wastefulness in checking into distant BBSs, especially with regards to channel utilization. Some standard would allow the BBS hosts to connect with each other and pass files (messages, programs, etc.) at appropriate times.

A (real or virtual) error-free full duplex channel is the medium of choice for file transfers. Unfortunately there isn't much around in the way of readily available programs or standard that can send and save multiple files without the bulk of built-in error detection ; It would be futile to check for errors on guaranteed data from the TNC, and it would merely slow down the transfer rate and make the program harder to write for any given machine.

The protocol might need to: >Decide which end is sending (or better yet let them both be able to send to each other simultaneously) >Transfer a certain number of characters that will be considered the file name (or an END OF TRANSMISSION sequence) >Send the file >Mark the end of the file and do another one.

What should the protocol <u>really</u> do? What are your thoughts on file transfers? (WHAT TO DO ANSWER NR 1)

<u>Split screens</u> are familiar to a lot of RTTY ops. The glass-teletype notion of the video terminal has been undermined by the shift towards split screens and windows in both RTTY and commercial applications.

The split screen is used to carry two sets of information on the (single!) screen, and would be quite useful on packet because when one is composing the next transmission, having any received text immediately show up elsewhere on the screen is even better than full break-in on CW! Good (and not so good) typists can carry on a natural conversation in this 2-way environment, and can almost immediately interrupt each other as in face-to-face dialogue. (Will packet promote bad manners?) Moreover, the need to use 'K' or some other end of transmission indicator, if you use it at all, is no longer necessary with split screen

While we're giving a lot of emphasis on improving the technical foundation of amateur packet switching networks, it is at last equally important that we also consider the convenience of the users and how <u>they</u> interface with the equipment. In this respect, I think that two screens are a natural for packet. (WHAT TO DO NR 2)

How do you fit 8K of text into 6K of disk? You either compress or you don't (do it at all, that is). A <u>compression algorithm</u>, standing alone or related to a file transfer protocol, might encode sequences of a single character, or convert common sequences like 'th' or another frequently occurring set of characters, in a space-saving way. Why not do this, if you can't think of WHAT TO DO (NR 3)?

SOFT TOUCH. I'm trying to collect information on programs for all systems that have packet applications. If you have a program that you wrote, or you are using a commercial package that you would like others

to know about, please pass the details along and I will also describe it in this column. Some of the kinds of programs I'd like to index include terminal programs, TNC controllers, gateways, etc. Radio Shack, Commodore, IBM, S-100, send 'em in!

GATOR 1

The GATOR 1 effort is moving along smoothly under the coordination of Ted, K4NTA. GATOR 1 will be the first step towards the linking of the SOUTHNET switches.

GATOR 1 development team: Team coordinator, T. Huf K4NTA, RF Hardware, G. Avery KA4UTK, Computer H. Goldstein N2WX.

Geoff KA4UTK reports that he is confident that 19.2K baud will be attainable with modified kit-type 220Mhz rigs and a special demodulator chip.

The digital side will use the Xerox 820 "Big Board" and the Z-8530 FAD board (please see the June BEACON). For those interested, the 820 board is approximately 12.5"x11.5", and is still available as a bare board from at least one Texas company.

The interswitch protocol will patch another routing facility to the network in a way similar to the now familiar 'standard' AX.25 level 2 digipeater patch. Switch names appear to be digipeater "callsigns" as far as the user is concerned. As far as the address fields are concerned, only the source and destination switches are specified (in addition to any optional regular digipeaters which must lie outside the source-dest address sub fields).

A GATOR 1 switch is identified by the area code (ala Bell) it serves in addition to the airport designator or another three letter sequence. Ex: 813TPA, 404ATL. When a switch hears a 1200 baud frame who's next outstanding address sub field matches it's own, it assumes that it is meant for relay and attempts to route it to an adjacent switch that is virtually closer to the destination along the connection it maintains with up to 3 of these GATOR 1 switches. Frames received on the high speed side are examined as to their destination and get sent either to a switch closer to the destination area, or are passed to the 1200 baud transmit buffer if the local address matches the destination address.

Example: Miami FL to Jacksonville FL- the user specifies: CONNECT N4UF VIA 305MIA 904JAX. Assuming the 305MIA switch hears me, it will take every one of my frames, set the H (has been repeated) bit on 305MIA and insert it into a virtual circuit with an adjacent switch that is nearer the 904 area code. Note that the routing is implicit, i.e. the path that the frames traverse is implied by the destination of each frame, and not by the user (now). ORLANDO TO WEST PALM BEACH: CONNECT WA4HXZ VIA K4AHO 305ORL 305WPB WA4ARE-1. This example assumes that the AHO digipeater is needed in Orlando to reach the 305ORL switch. The same condition exists between WA4HXZ and 305WPB in this example.

The software machine that is the GATOR 1 switch was designed to fit into the 1K or so bytes left in EPROM, and to run concurrently with the regular 1200 baud (low speed) digipeater code on the Xerox 820 (see Fig. 1 for block diagram). The A channel of the 8530 is used for the high speed side and the B port for the existing low speed channel. In this fashion interrupt priority is given to data flowing on the A channel, as servicing here must be accomplished much faster as the data rate is higher.

GATOR 1 protocol: The high speed links, i.e. the connections between adjacent GATOR 1 switches, use a virtual connection protocol similar to AX.25 level 3, but simplified. Each GATOR 1 switch will strive to maintain a connection with its neighbors by polling the current connection state and, should the connection be down, sending GATOR 1 connect frames to the appropriate switch. Once the connection(s) have been established with adjacent switches, they may now exchange data.

Frames passed between the switches are from 3 to 4096 octets long (excluding flag and CRC bytes). The shortest frames contain the source and destination CID (city ID) octets and a single command or status octet. Longer frames contain these plus an information field, which may contain multiple sub fields, each containing a complete copy of the relayed AX.25 level 2 frame.

FADCA>BEACON

Further details of the GATOR 1 interswitch will be in next months BEACON.

FIGURE 1

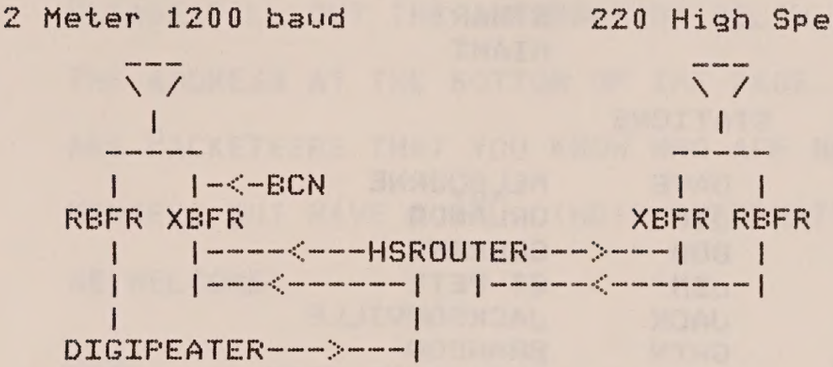

FIGURE 2

GATOR 1 frame format
TIME---------->

|FLAG|DEST CID|SRC CID|CMD/STAT|INFO|CRC|FLAG|

where: DEST CID,
SRC CID are unique octets assigned to a switch as its address
INFO only where the CMD specifies an info frame, formatted like:

Offset	Comments
+0,+1	Length of following sub field (L)
+2...L+1	Data in sub field
<L+2,L+3	length of second sub field
.....>	info, ad nauseum up to 4096 octets

CMD/STAT octet:

|7|6|5|4|3|2|1|0

x | | | | | s s------s s

- 0 0 - Info frame
- 0 1 - Ack of Info
- 1 0 - Connect command
- 1 1 - Connect request ack'd
- POLL/DONT POLL* (when rcvd, returns an ACK if cnctd)
- Connected/Connected*
- V(S) >
- V(R) >--Modulo 2 - similar to AX.25
- N(R) >

x - don't care

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KNOW FLORIDA PACKET STATIONS AS OF 7/22/84

DIGIPEATERS

WA4ARE-1	W PALM BEACH
K4NTA-1	STUART
W4NVU	MIAMI

STATIONS

K3AAX	DAVE	MELBOURNE
K4AHO	JIM	ORLANDO
N4APC	BOB	SEBRING
W4APV	JIM	ST PETE
KB4B	JACK	JACKSONVILLE
W1BEL	GWYN	BRANDON
WD4BMN	LARRY	ALTAMONTE SPGS
WD4BRF	GEORGE	STUART
K4CAJ	CECIL	W PALM BEACH
WD0EEL	JIM	BOCA RATON
KF4EF	PAT	~~BRANDON~~ TAMPA
WB4FSG	ALTON ?	JACKSONVILLE
K4GFG	TOM	DAVIE
WA4HXZ	HENRY	W PALM BCH
KF4I	LARRY	JENSEN BCH
WD4IXI	BILL	ST PETERSBURG
WA4IYY	CHARLIE	OKEECHOBEE
WD4JKM	BILL	MIAMI
NK4K	BILL	MIAMI
W2KGV	LADD	PT ST LUCIE
KF4LG	BILL	BRANDON
WD4LHF	JAMES	W PALM BCH
KA4LIF	THOM	PT ST LUCIE
WD4MBL	RENE	MIAMI
K4NTA	TED	STUART
W4ORA	JIM	TAMPA
W4PCM	DICK	JACKSONVILLE
KE4PM	LARRY	AVON PARK
W0RAO	ED	ORLANDO
K4RHD	BILL	~~TAMPA~~ SEMINOLE
KK4S	RAY	SARASOTA
KI4T	JOEL	MIAMI
KA4UTK	GEOFF	W PALM BCH
KE4VR	BOB	LAKE PARK
KA4VWW	GUY	STUART
KF4WM	JACK	ORLANDO
N2WX	HOWIE	PALM BAY
WB8ZPE	BRAD	BRANDON

WE ARE SURE THAT THERE ARE MORE. LET US KNOW.

1ST EDITION FADCA TNC USERS DIRECTORY INFORMATION

PLEASE FILL OUT THE INFORMATION BELOW AND MAIL TO THE ADDRESS AT THE BOTTOM OF THE PAGE. IF THERE ARE PACKETEERS THAT YOU KNOW WHO ARE NOT FADCA MEMBERS BUT HAVE A TNC, THEIR INFORMATION WILL ALSO BE WELCOME.

NAME:_____ CALL:_____

ADDRESS:_____

CITY:_____ STATE:_____ ZIP:_____

TELEPHONE:_(___)_____

MANUFACTUER OF TNC IN USE:_____

TERMINAL OR COMPUTER USED W/TNC:_____

RIG:_____ANT._____ANT. HGT._____

POWER OUTPUT:_____

HOW OFTEN IS YOUR TNC ON? (HRS/DAY)_____

WHAT IS YOUR MOST FREQUENT TIME OF OPERATION?

_____

HAVE YOU TRIED HF OPERATION?_____

HAVE YOU TRIED SATELLITE OPERATION?_____

OTHER COMMENTS_____

_____

MAIL TO: BRAD VOSS
625 CEDAR GROVE DRIVE
BRANDON, FLORIDA 33511

FLORIDA AMATEUR DIGITAL COMMUNICATIONS ASSOCIATION MEMBERSHIP REQUEST

NAME.....CALLSIGN.....

LICENSE CLASS..... TAPR MEMBER? Y/N OTHER MEMBER?.....

ADDRESS.....

CITY.....STATE.....ZIP.....

PHONE (H) (.....)..... (W) (.....).....

FREQUENCY HERE I CAN BE FOUND:.....

I OPERATE: RTTY? Y/N AMTOR? Y/N OTHER.....

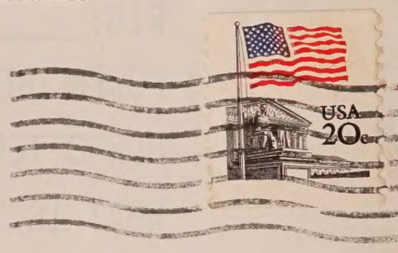
TYPE COMPUTER EQUIPMENT:.....

PACKET GEAR OWNED OR ON ORDERED? Y/N TYPE:.....

SUGGESTIONS, PROPOSALS, COMMENTS, NAMES OF OTHER INTERESTED PERSONS.....

;

MAIL THIS FORM AND YOUR MEMBERSHIP DUES OF $10 TO THE RETURN ADDRESS BELOW



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